CLAIMS

What is claimed is:

1. An apparatus, comprising:

a first waveguide core disposed in or on an integrated circuit package, the first waveguide core a first index of refraction and a first width;

a set of waveguide cores disposed in or on an integrated circuit die, each waveguide core in the set of waveguide cores having a second index of refraction higher than the first index of refraction and a second width smaller than the first width;

a cladding material disposed between the first waveguide core and the set of waveguide cores to mount the first waveguide to the set of waveguides;

a tapered waveguide disposed in or on the integrated circuit die and coupled to the set of waveguide cores; and

a planar waveguide formed in or on the integrated circuit die and coupled to the tapered waveguide.

2. The apparatus of claim 1, further comprising an optical fiber disposed on the integrated circuit package and coupled to the first waveguide core.

3. The apparatus of claim 2, further comprising a light source disposed in or on the integrated circuit package and coupled to the optical fiber.

4. The apparatus of claim 1, further comprising a second cladding material disposed on the first waveguide core, the second cladding material having a third index of refraction smaller than the first index of refraction.

5. The apparatus of claim 1, further comprising a second cladding material disposed under the set of waveguide cores.

6. An apparatus, comprising:

a first waveguide disposed in or on an integrated circuit package, the first waveguide supporting a single or multiple optical modes;

a waveguide set disposed in or on an integrated circuit die, the optical modes of the first waveguide being larger than a width of a subset of waveguides in the set of waveguides;

a light combiner formed in or on the integrated circuit die and coupled at one end to the waveguide set; and

a second waveguide formed in or on the integrated circuit die and coupled at a second end to the light combiner.

7. The apparatus of claim 6, wherein the waveguide set is mounted to the first planar waveguide using a thin film of cladding material.

8. The apparatus of claim 7, wherein a width of the waveguide set is larger than a width of the first waveguide.

9. A method, comprising:

propagating light in a first waveguide core disposed in or on an integrated circuit package;

coupling the light to a subset of waveguide cores in a waveguide core set disposed in or on an integrated circuit die, the first waveguide core having a first index of refraction, each waveguide core in the waveguide core set having a second index of refraction, the first index of refraction being smaller than the second indices of refraction;

merging light from the waveguide core set to a waveguide disposed in or on the integrated circuit die; and

propagating the merged light to a waveguide disposed in or on the integrated circuit die.

10. The method of claim 9, further comprising propagating light from an optical fiber to the first waveguide core.

11. The method of claim 8, further comprising propagating light from a light source into an optical fiber.

12. The method of claim 9, further comprising propagating light from the waveguide to integrated circuit die circuitry.

13. A system, comprising:

a microprocessor package having a first waveguide disposed therein or thereon, the first waveguide having an optical mode; and

a static random access memory (SRAM) die having:

a waveguide set disposed therein or thereon, the optical mode of the first waveguide being larger than a width of a subset of waveguides in the set of waveguides;

a light combiner formed in or on the SRAM die and coupled at one end to the waveguide set; and

a second waveguide formed in or on the SRAM die and coupled at a second end to the light combiner.

14. The method of claim 13, further comprising a clock generator coupled to the microprocessor package.

15. The method of claim 14, further comprising a phase-locked loop clock generator coupled to the microprocessor package.

16. The method of claim 13, further comprising SRAM cells coupled to the second waveguide..

17. An apparatus, comprising:

a first waveguide core disposed in or on an integrated circuit die, the first waveguide core a first index of refraction and a first width;

a set of waveguide cores disposed in or on the integrated circuit die, each waveguide core in the set of waveguide cores having a second index of refraction higher than the first index of refraction and a second width smaller than the first width;

a cladding material disposed between the first waveguide core and the set of waveguide cores to mount the first waveguide to the set of waveguides;

several waveguide combiners disposed in or on the integrated circuit die, each waveguide combiner coupled to at least two waveguide cores in the set of waveguide cores; and

a planar waveguide formed in or on the integrated circuit die and coupled to the waveguide combiners.

18. The apparatus of claim 17, further comprising an optical fiber coupled to the first waveguide core.

19. The apparatus of claim 18, further comprising a light source coupled to the optical fiber.